



# Supporting Hydrometeorological Research and Applications with Global Precipitation Measurement (GPM) Products and Services

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# Outline

- Introduction
- GPM Data Product Overview
- Data Services
- Applications
- Conclusion
- Future work
- Acknowledgements
- Links/information



# Introduction

- Precipitation is a critical variable in the global hydrologic cycle and our daily lives (droughts, floods, outdoor activities, diseases, etc.).



Yangtze River near ChongQing during the 2010 droughts in SW China



Ongoing Flooding in the U.S. Midwest



# Data and Services Facilitate Research and Applications

- Data at the GES DISC: global precipitation, solar irradiance, atmospheric composition and dynamics, water and energy cycle, global modeling, etc.
- Services: Giovanni, Simple Subset Wizard, UUI (Unified User Interface), etc.



# GPM Products at GES DISC

## GES DISC

Goddard Earth Sciences Data and Information Services Center



National Aeronautics and  
Space Administration

Google™ Custom Search



Data Services

Mission Portals

Science Portals

Info

### Mirador

Data Access Made Simple

+ OVERVIEW

+ HELP CENTER

+ DATA HOLDINGS

#### Additional Features

+ News

+ Restricted Data

+ Feedback

+ FAQ

You are here: [Project](#) » [GPM](#)

Keyword

Projects

Science Areas

#### GPM

Global Precipitation Measurement (GPM) is an international satellite mission to provide next-generation observations of rain and snow worldwide. NASA and the Japanese Aerospace Exploration Agency (JAXA) launched the GPM Core Observatory satellite on February 27th, 2014, carrying advanced instruments that will set a new standard for precipitation measurements from space. The data they provide will be used to unify precipitation measurements made by an international network of partner satellites to quantify when, where, and how much it rains or snows around the world.

Data Group	Description	Date Range
<a href="#">Orbital L1 (28)</a>	Orbital data at the sensor's resolution: 1) Level-1A: Reconstructed, unprocessed instrument data at full resolution, time referenced, and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing parameters, computed and appended, but not applied, to Level 0 data; 2) Level-1B: Radiometrically corrected and geolocated Level 1A data that have been processed to sensor units; and 3) Level-1C: common intercalibrated microwave brightness temperature (Tc) products.	2006-12-31 to 2016-01-05
<a href="#">Orbital L2 (22)</a>	Derived geophysical parameters at the same resolution and location as those of the Level-1 data.	2013-03-31 to 2016-01-05
<a href="#">Gridded L3 (36)</a>	Geophysical parameters that have been spatially and/or temporally resampled from Level 1 or Level 2 data.	2014-02-01 to 2016-01-05



NASA Privacy Policy and Important Notices

+ Contact Us: GES DISC Help Desk  
+ NASA Official: Steven Kempler



# GPM Level-1 Products

Data Set	Description	Date Range	Number of Items	Avg Size (MB)
<a href="#">GPM 1AGML03</a> <a href="#">info</a>	GPM GMI Level 1A unpacked packet data	2014-03-04 to 2016-01-06	10457	102.44
<a href="#">GPM 1BGML03</a> <a href="#">info</a>	GPM GMI Level 1B Brightness Temperatures	2014-03-04 to 2016-01-06	10456	57.951
<a href="#">GPM 1CF16SSMIS.02</a> <a href="#">info</a>	GPM, SSMI F16 Level 1C Common Calibrated Brightness Temperatures	2013-03-31 to 2016-01-04	11181	22.86
<a href="#">GPM 1CF17SSMIS.02</a> <a href="#">info</a>	GPM, SSMI F17 Level 1C Common Calibrated Brightness Temperatures	2013-03-31 to 2016-01-04	11182	22.544
<a href="#">GPM 1CF18SSMIS.02</a> <a href="#">info</a>	GPM, SSMI F18 Level 1C Common Calibrated Brightness Temperatures	2013-03-31 to 2016-01-04	11185	21.656
<a href="#">GPM 1CGCOMW1AMSR2.03</a> <a href="#">info</a>	GPM, AMSR2 GCOMW1 Level 1C Common Calibrated Brightness Temperature	2013-03-31 to 2016-01-04	11481	83.243
<a href="#">GPM 1CGPMGML03</a> <a href="#">info</a>	GPM GMI Level 1C Common Calibrated Brightness Temperatures Collocated	2014-03-04 to 2016-01-06	10457	27.416
<a href="#">GPM 1CGPMGML R.03</a> <a href="#">info</a>	GPM Level 1C R Common Calibrated Brightness Temperatures Collocated	2014-03-04 to 2016-01-06	10367	25.698
<a href="#">GPM 1CMETOPAMHS.02</a> <a href="#">info</a>	GPM, METOPA MHS Level 1C Common Calibrated Brightness Temperatures	2007-05-21 to 2016-01-04	13496	3.827
<a href="#">GPM 1CMETOPBMHS.02</a> <a href="#">info</a>	GPM, METOPB MHS Level 1C Common Calibrated Brightness Temperatures	2013-04-23 to 2016-01-04	10903	3.855
<a href="#">GPM 1CMT1SAPHIR.02</a> <a href="#">info</a>	GPM, MT1 SAPHIR Level 1C Common Calibrated Brightness Temperatures	2014-01-27 to 2015-12-31	9456	9.469
<a href="#">GPM 1CNOAA18MHS.02</a> <a href="#">info</a>	GPM, MT1 SAPHIR Level 1C Common Calibrated Brightness Temperatures	2006-12-31 to 2016-01-04	16363	3.879
<a href="#">GPM 1CNOAA19MHS.02</a> <a href="#">info</a>	GPM, NOAA-19 MHS Level 1C Common Calibrated Brightness Temperatures	2013-03-31 to 2016-01-04	11204	3.938
<a href="#">GPM 1CTRMMTMI.02</a> <a href="#">info</a>	GPM, TRMM TMI Level 1C Common Calibrated Brightness Temperatures	2014-02-01 to 2015-04-08	5684	13.729
<a href="#">GPM BASEGPMGML03</a> <a href="#">info</a>	GPM Level 1BASE Common Calibrated Brightness Temperatures	2014-03-04 to 2015-07-29	7958	185.974





# GPM Level-2 Products

## Orbital L2

Derived geophysical parameters at the same resolution and location as those of the Level-1 data.

### [Spatial and Temporal Search](#)

Data Set	Description	Date Range	Number of Items	Avg Size (MB)
<a href="#">GPM_2ADPR.03</a> <a href="#">info</a>	GPM, DPR Level 2A DPR environment V03	2015-08-31 to 2016-01-05	1982	397.632
<a href="#">GPM_2AGPROFF16SSMIS.03</a> <a href="#">info</a>	GPM, SSMI F16 Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11181	16.248
<a href="#">GPM_2AGPROFF17SSMIS.03</a> <a href="#">info</a>	GPM, SSMI F17 Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11182	16.528
<a href="#">GPM_2AGPROFF18SSMIS.03</a> <a href="#">info</a>	GPM SSMI F18 Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11184	16.509
<a href="#">GPM_2AGPROFGCOMW1AMSR2.03</a> <a href="#">info</a>	GPM, AMSR2 GCOMW1 Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11481	52.919
<a href="#">GPM_2AGPROFGPMGMI.03</a> <a href="#">info</a>	GPM GMI Level 2A Radiometer Profiling	2014-03-04 to 2016-01-04	10444	16.664
<a href="#">GPM_2AGPROFMETOPAMHS.03</a> <a href="#">info</a>	GPM, METOPA MHS Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	10500	5.307
<a href="#">GPM_2AGPROFMETOPBMHS.03</a> <a href="#">info</a>	GPM, METOPB MHS Level 2A Radiometer Profiling	2013-04-23 to 2016-01-04	10917	5.312
<a href="#">GPM_2AGPROFNOAA18MHS.03</a> <a href="#">info</a>	GPM, NOAA-18 MHS Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11190	5.394
<a href="#">GPM_2AGPROFNOAA19MHS.03</a> <a href="#">info</a>	GPM, NOAA-19 MHS Level 2A Radiometer Profiling	2013-03-31 to 2016-01-04	11190	5.42
<a href="#">GPM_2AKa.03</a> <a href="#">info</a>	GPM, DPR Level 2A Ka Precipitation	2015-08-31 to 2016-01-05	1983	187.477
<a href="#">GPM_2AKu.03</a> <a href="#">info</a>	GPM, DPR Level 2A Ku Precipitation	2015-08-31 to 2016-01-05	1983	209.706
<a href="#">GPM_2BCMB.03</a> <a href="#">info</a>	GPM, DPR, GMI Level 2B Level-2 DPR and GMI Combined	2015-08-30 to 2016-01-05	1982	121.822



# GPM Level-2 Products

## Gridded L3

Geophysical parameters that have been spatially and/or temporally resampled from Level 1 or Level 2 data.

### [Spatial and Temporal Search](#)

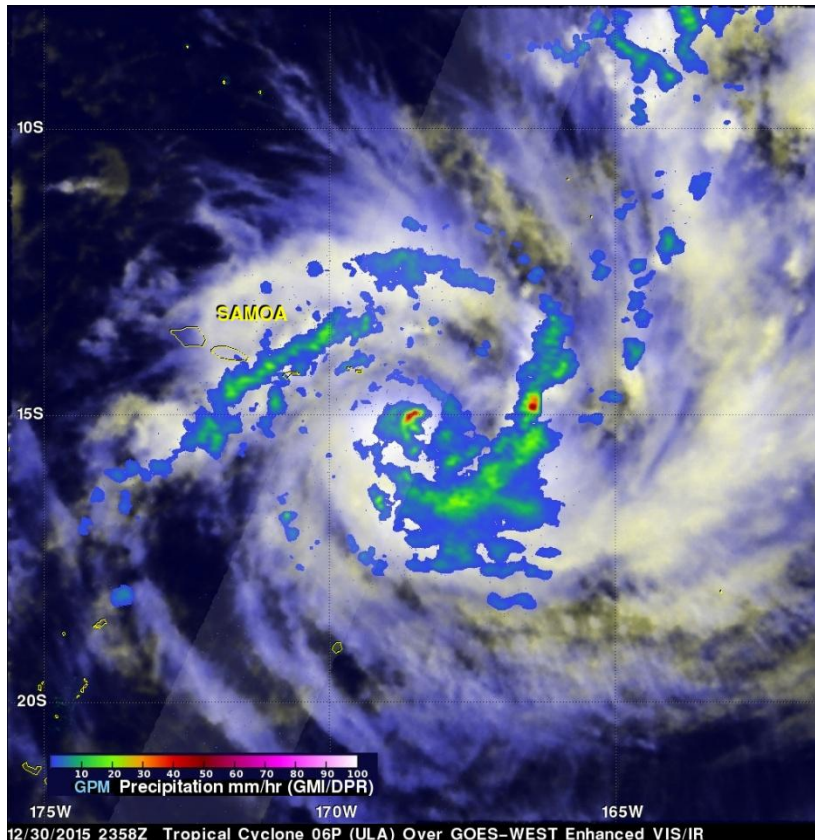
Data Set	Description	Date Range	Number of Items	Avg Size (MB)
<a href="#">GPM_3BCMB_DAY.03</a> <a href="#">info</a>	GPM, DPR, GMI Level 3 Combined Precipitation	2015-03-15 to 2016-01-02	294	63.654
<a href="#">GPM_3DPR_ASC.03</a> <a href="#">info</a>	GPM, DPR Level 3 DPR Ascending Daily	2015-02-20 to 2016-01-04	319	59.486
<a href="#">GPM_3DPR_DES.03</a> <a href="#">info</a>	GPM, DPR Level 3 DPR Descending Daily	2015-02-20 to 2016-01-04	319	59.238
<a href="#">GPM_3GPROFF16SSMIS.03</a> <a href="#">info</a>	GPM, SSMI F16 Level 3 Monthly GPROF Profiling	2014-02-01 to 2015-12-31	23	19.421
<a href="#">GPM_3GPROFF16SSMIS_DAY.03</a> <a href="#">info</a>	GPM, SSMI F16 Level 3 Daily GPROF Profiling	2014-02-27 to 2016-01-03	675	15.73
<a href="#">GPM_3GPROFF17SSMIS.03</a> <a href="#">info</a>	GPM, SSMI F17 Level 3 Monthly GPROF Profiling	2014-02-01 to 2015-12-31	23	19.665
<a href="#">GPM_3GPROFF17SSMIS_DAY.03</a> <a href="#">info</a>	GPM, SSMI F17 Level 3 Daily GPROF Profiling	2014-02-27 to 2016-01-03	675	16.032
<a href="#">GPM_3GPROFF18SSMIS.03</a> <a href="#">info</a>	GPM, SSMI F18 Level 3 Monthly GPROF Profiling	2014-08-01 to 2015-12-31	17	19.679
<a href="#">GPM_3GPROFF18SSMIS_DAY.03</a> <a href="#">info</a>	GPM, SSMI F18 Level 3 Daily GPROF Profiling	2014-02-27 to 2016-01-03	676	16.072
<a href="#">GPM_3GPROFGCOMW1AMSR2.03</a> <a href="#">info</a>	GPM, AMSR2 GCOMW1 Level 3 Monthly GPROF Profiling	2014-02-28 to 2015-12-31	23	20.497
<a href="#">GPM_3GPROFGCOMW1AMSR2_DAY.03</a> <a href="#">info</a>	GPM, AMSR2 GCOMW1 Level 3 Daily GPROF Profiling	2014-02-27 to 2016-01-03	675	16.504
<a href="#">GPM_3GPROFGPMGMI.03</a> <a href="#">info</a>	GPM GMI Level 3 Monthly GPROF Profiling	2014-03-01 to 2015-12-31	22	16.072
<a href="#">GPM_3GPROFGPMGMI_DAY.03</a> <a href="#">info</a>	GPM GMI Level 3 Daily GPROF Profiling	2014-03-05 to 2016-01-02	669	11.091

<a href="#">GPM_3GPROFMETOPAMHS.03</a> <a href="#">info</a>	GPM, METOPA MHS Level 3 Monthly
<a href="#">GPM_3GPROFMETOPAMHS_DAY.03</a> <a href="#">info</a>	GPM, METOPA MHS Level 3 Daily
<a href="#">GPM_3GPROFMETOPBMHS.03</a> <a href="#">info</a>	GPM, METOPB MHS Level 3 Monthly
<a href="#">GPM_3GPROFMETOPBMHS_DAY.03</a> <a href="#">info</a>	GPM, METOPB MHS Level 3 Daily
<a href="#">GPM_3GPROFNOAA18MHS.03</a> <a href="#">info</a>	GPM, NOAA-18 MHS Level 3 Monthly
<a href="#">GPM_3GPROFNOAA18MHS_DAY.03</a> <a href="#">info</a>	GPM, NOAA-18 MHS Level 3 Daily
<a href="#">GPM_3GPROFNOAA19MHS.03</a> <a href="#">info</a>	GPM, NOAA-19 MHS Level 3 Monthly
<a href="#">GPM_3GPROFNOAA19MHS_DAY.03</a> <a href="#">info</a>	GPM, NOAA-19 MHS Level 3 Daily
<a href="#">GPM_3GPROFTRMMTMI.03</a> <a href="#">info</a>	GPM, TRMM TMI Level 3 Monthly
<a href="#">GPM_3GPROFTRMMTMI_DAY.03</a> <a href="#">info</a>	GPM, TRMM TMI Level 3 Daily
<a href="#">GPM_3IMERGHH.03</a> <a href="#">info</a>	GPM Level 3 IMERG Half Hourly
<a href="#">GPM_3IMERGM.03</a> <a href="#">info</a>	GPM Level 3 IMERG Monthly

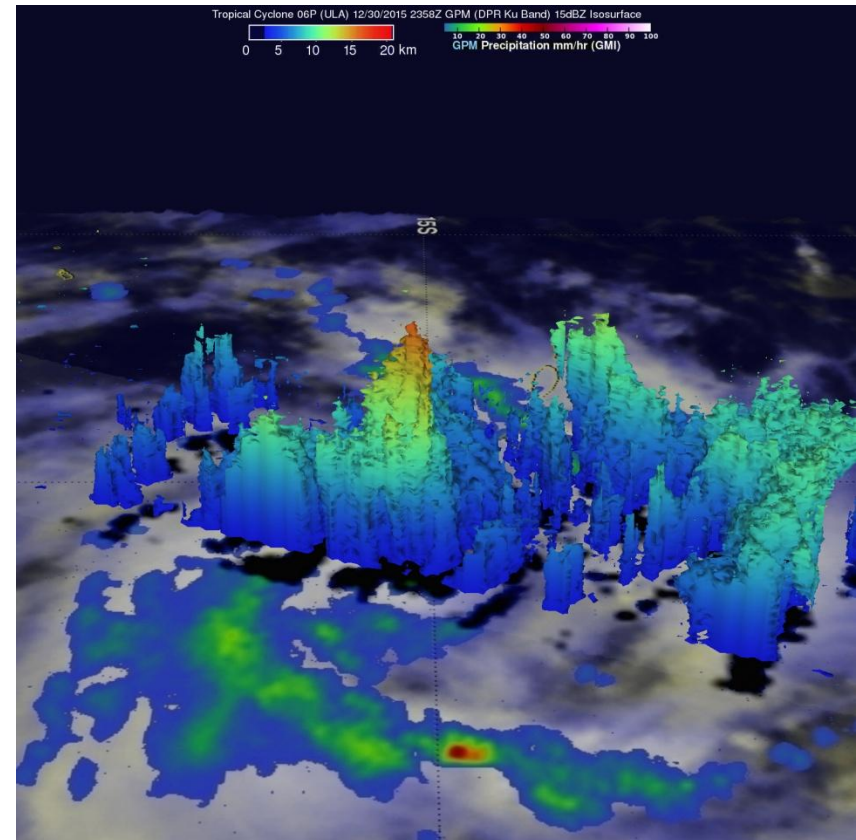




# Examples:



GMI/DPR combined precipitation  
for Tropical Cyclone ULA

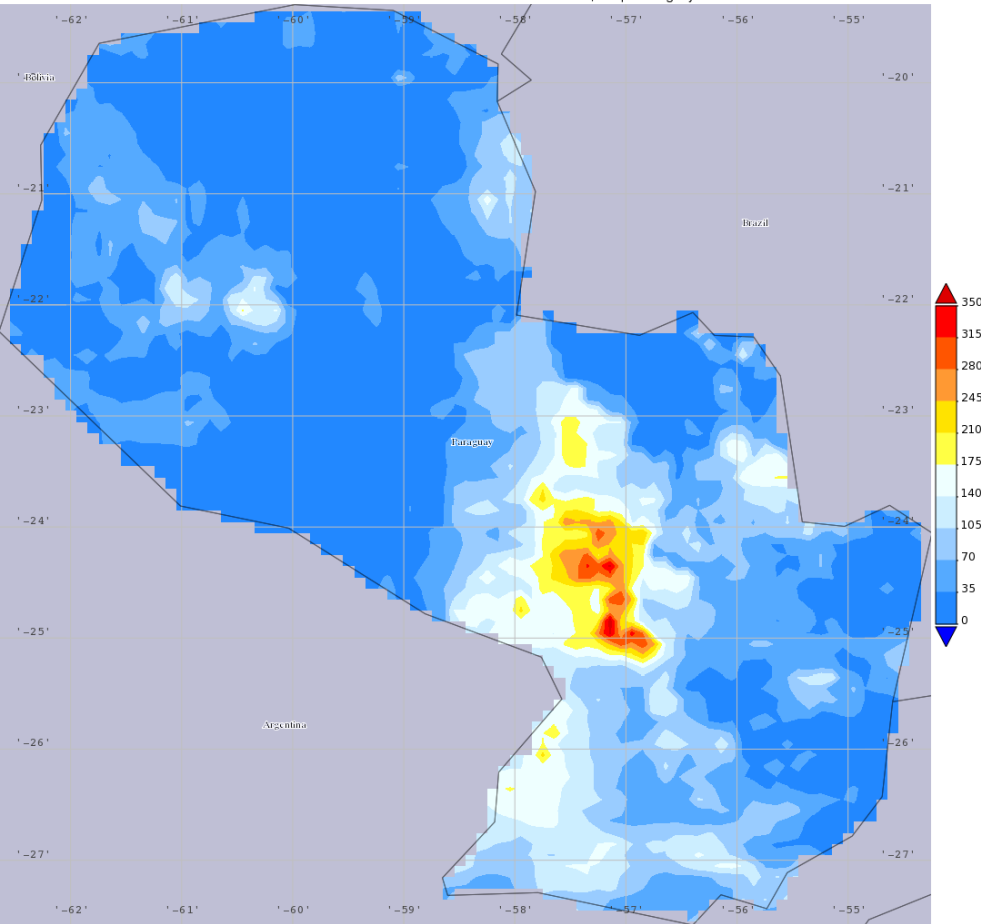


DPR reflectivity (Ku band, 15 dBZ  
isosurface)



# Examples (Cont'd)

Map, Accumulated of Multi-satellite precipitation estimate with climatological gauge calibration - Late Run half-hourly 0.1 deg. [GPM GPM\_3IMERGHHL v03] mm over 2015-12-22 00:00Z - 2015-12-29 23:59Z, Shape Paraguay



Deadly Flooding in Paraguay in Dec. 2015

IMERG – Late (mm)



# GPM Data Services

EARTHDATA Data Discovery ▾ DAACs ▾ Community ▾ Science Disciplines ▾

GES DISC

imerg

Feedback Help

Atmospheric Composition, Water and Energy Cycle, and Climate Variability Data

0110 Datasets

Showing (7) datasets associated with imerg...

Refine By

Subjects

☐ Atmospheric Phenomena (3)

☐ Precipitation (7)

Measurements

Sort ▾

☐ Cyclones (3)

☐ Drought (3)

☐ Hurricanes (3)

☐ Liquid Precipitation (4)

☐ Monsoons (3)

More...

Source

☐ GPM DPR (4)

☐ GPM GMI (7)

Processing Level

☐ 3 (7)

Temporal Resolution

Sort ▾

☐ 30 minutes (3)

☐ 1 day (3)

☐ 1 month (1)

Spatial Resolution

☐ 0.1 ° (7)

Unified User Interface (UII) – One place for all data related activities



# GPM Data Services (Cont'd)

[Data Services](#)[Mission Portals](#)[Science Portals](#)[Info](#)

## GES DISC

Goddard Earth Sciences Data and Information Services Center

You are here: [GES DISC Home](#) » GPM\_3IMERGM Version 03: GPM Level 3 IMERG Monthly 0.1 x 0.1 degree Precipitation

### GPM\_3IMERGM Version 03: GPM Level 3 IMERG Monthly 0.1 x 0.1 degree Precipitation

[Data Citation](#)[Get Data](#)[Summary](#)[Data Documents](#)

#### Data Access

Data Service Name: ON-LINE ARCHIVE

Data Service Description: Access the data via FTP

Data Service Access URL: [ftp://gpm1.gesdisc.eosdis.nasa.gov/data/s4pa/GPM\\_L3/GPM\\_3IMERGM.03/](ftp://gpm1.gesdisc.eosdis.nasa.gov/data/s4pa/GPM_L3/GPM_3IMERGM.03/)

Data Service Name: SSW

Data Service Description: Simple Subset Wizard

Data Service Access URL: [http://disc.sci.gsfc.nasa.gov/SSW/#keywords=GPM\\_3IMERGM%2003](http://disc.sci.gsfc.nasa.gov/SSW/#keywords=GPM_3IMERGM%2003)

Data Service Name: MIRADOR

Data Service Description: Mirador (from Spanish, a place providing a wide view) is a Google-based data archive search interface that allows searching, browsing, and retrieving of Earth science data at NASA GES DISC

Data Service Access URL: [http://mirador.gsfc.nasa.gov/cgi-bin/mirador/homepageAlt.pl?keyword=GPM\\_3IMERGM](http://mirador.gsfc.nasa.gov/cgi-bin/mirador/homepageAlt.pl?keyword=GPM_3IMERGM)

Data Service Name: GIOVANNI

Data Service Description: Online visualization and analysis

Data Service Access URL: [http://giovanni.gsfc.nasa.gov/giovanni/#service=INTERACTIVE\\_MAP&starttime=&endtime=&bbox=-180,-90,180,90&dataKeyword=imerg](http://giovanni.gsfc.nasa.gov/giovanni/#service=INTERACTIVE_MAP&starttime=&endtime=&bbox=-180,-90,180,90&dataKeyword=imerg)

Data Service Name: OPENDAP DATA (DODS)

Data Service Description: Access the data via the OPeNDAP protocol

Data Service Access URL: [http://gpm1.gesdisc.eosdis.nasa.gov/opendap/hyrax/GPM\\_L3/GPM\\_3IMERGM.03/contents.html](http://gpm1.gesdisc.eosdis.nasa.gov/opendap/hyrax/GPM_L3/GPM_3IMERGM.03/contents.html)

Data Service Name: REVERB

Data Service Description: Search and retrieve data with Reverb ECHO

Data Service Access URL: [http://reverb.echo.nasa.gov/reverb/#utf8=%E2%9C%93&spatial\\_map=satellite&spatial\\_type=rectangle&keywords=GPM\\_3IMERGM](http://reverb.echo.nasa.gov/reverb/#utf8=%E2%9C%93&spatial_map=satellite&spatial_type=rectangle&keywords=GPM_3IMERGM)

For further information or assistance email the NASA GES DISC Help Desk: [gsfc-help-disc@lists.nasa.gov](mailto:gsfc-help-disc@lists.nasa.gov)





# GPM Data Services (Cont'd)

EARTHDATA

Data Discovery ▾ DAACs ▾ Community ▾ Science Disciplines ▾

## GIOVANNI

The Bridge Between Data and Science v 4.17.1 [Release Notes](#) [Browser Compatibility](#) [Known Issues](#)

MODIS Collection 6... [1 of 2 messages] [Read More](#)

Select Plot

☒ Maps: Time Averaged Map ▾

☐ Comparisons: Select... ▾

☐ Time Series: Select... ▾

☐ Vertical: Select... ▾

☐ Miscellaneous: Select... ▾

Select Date Range (UTC)

YYYY-MM HH:mm

-

-

00

:

00

to

-

-

23

:

59

Valid Range: 2014-04-01 to 2015-08-31

Select Region (Bounding Box or Shapefile)

Format: West, South, East, North

-180,-90,180,90

Show Map

Show Shapes

Please specify a start date.

Select Variables

▼ Disciplines

☐ Hydrology (17)

▼ Measurements

☐ Precipitation (17)

► Platform / Instrument

► Spatial Resolutions

► Temporal Resolutions

► Portal

Number of matching Variables: 17 of 789    Total Variable(s) included in Plot: 1

Keyword : imerg 

Search Clear

	Variable Name	Source	Temp. Res.	Spat. Res.	Begin Date	End Date	Units	Vert. Slice
<input checked="" type="checkbox"/>	<a href="#">Merged satellite-gauge precipitation estimate - Final Run (recommended for general use) (GPM_3IMERGM v03)</a>	GPM	Monthly	0.1 °	2014-04-01	2015-08-31	<div>mm/hr ▾</div>	-
<input type="checkbox"/>	<a href="#">Weighting of observed gauge precipitation relative to the multi-satellite precipitation estimate - Final Run (GPM_3IMERGM v03)</a>	GPM	Monthly	0.1 °	2014-04-01	2015-08-31	%	-
<input type="checkbox"/>	<a href="#">Accumulation-weighted probability of liquid precipitation phase - Final Run (GPM_3IMERGM v03)</a>	GPM	Monthly	0.1 °	2014-04-01	2015-08-31	%	-
<input type="checkbox"/>	<a href="#">Random error for merged satellite-gauge precipitation - Final Run (GPM_3IMERGM v03)</a>	GPM	Monthly	0.1 °	2014-04-01	2015-08-31	mm/hr	-
<input type="checkbox"/>	<a href="#">Merged microwave-only precipitation estimate - Final Run (GPM_3IMERGHH v03)</a>	GPM	Half-Hourly	0.1 °	2014-03-12	2015-08-31	mm/hr	-
<input type="checkbox"/>	<a href="#">Microwave satellite observation time - Final Run (GPM_3IMERGHH v03)</a>	GPM	Half-Hourly	0.1 °	2014-03-12	2015-08-31	minutes	-
<input type="checkbox"/>	<a href="#">Microwave satellite source identifier - Final Run (GPM_3IMERGHH v03)</a>	GPM	Half-Hourly	0.1 °	2014-03-12	2015-08-31	-	-

Help

Reset

Feedback

Plot Data

**Giovanni:** Geospatial Interactive Online Visualization ANd aNalysis Infrastructure



# GPM Data Services (Cont'd)

Product in Giovanni	Variables
Early Run ~ 6 hour latency	multi-satellite precipitation estimate, random error
Late Run ~18 hour Latency	multi-satellite precipitation estimate, random error
Final Run ~4 month latency	multi-satellite precipitation estimate, IR-only precipitation estimate, merged microwave-only precipitation estimate, probability of liquid precipitation phase, random error, etc.





# GPM Data Services (Cont'd)

**EARTHDATA** Data Discovery ▾ DAACs ▾ Community ▾ Science Disciplines ▾

## Simple Subset Wizard (SSW) V1.14 [Release Notes](#)

1. Search for Data Sets    2. Select Subset Criteria    3. View Results

Enter values for the Date Range and (optionally) the Spatial Bounding Box to search for data sets; those criteria will also be used when data sets are subsetted by Date Range and Spatial Region.

Enter keywords or click the 'Select Data Sets' button.

**Data Set Keyword(s)**

Enter dates as YYYY-MM-DD or use the calendar icon.

**Date Range**   to

Enter South, West, North, East coordinates

**Spatial Bounding Box**

[Report a Problem with the Simple Subset Wizard](#)

NASA Official: Stephen Berrick    [Web Privacy Policy](#)    [Data & Information](#)

**Available Data Sets**

Data sets are sorted by the data archive center and project/mission.

- ☐ Alaska Satellite Facility Synthetic Aperture Radar Data Center
- ☐ Global Hydrology Resource Center
- ☐ Goddard Earth Sciences Data and Information Services Center
  - ☐ Aqua AIRS v005
  - ☐ Aqua AIRS v006
  - ☐ Aura HIRDLS
  - ☐ Aura MLS
  - ☐ Aura OMI
  - ☐ GLDAS Models
  - ☐ GPM
    - ☐ GPM IMERG
      - ☐ GPM\_3IMERGHH v03 [2014-03-12 - Present]
      - ☐ GPM\_3IMERGHHE v03 [2015-04-01 - Present]
      - ☐ GPM\_3IMERGHHL v03 [2015-03-07 - Present]
      - ☐ GPM\_3IMERGM v03 [2014-03-12 - Present]
  - ☐ MERRA
  - ☐ MERRA-2
  - ☐ NLDAS Models
  - ☐ OCO-2
  - ☐ OrbView-2 SeaWiFS
  - ☐ TOMS Earth Probe

Simple Subset Wizard (SSW). NetCDF, ASCII



# Applications

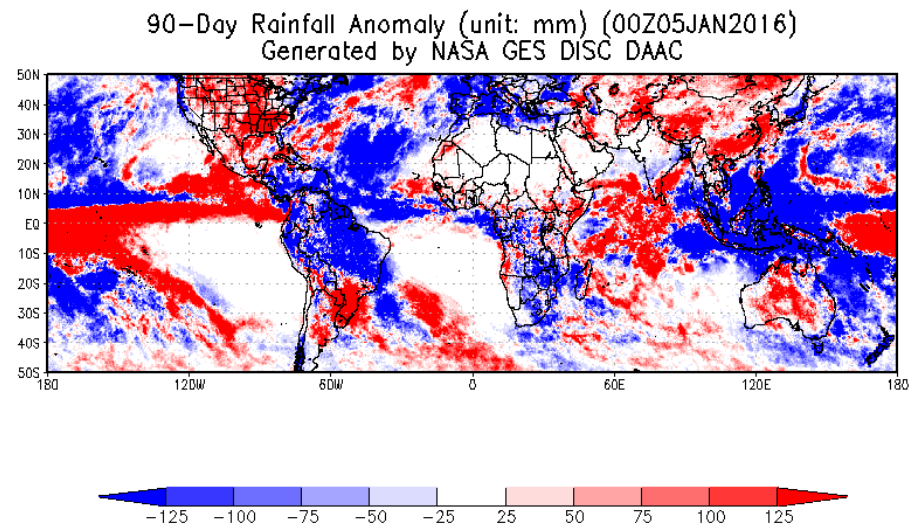
- Current Conditions (under development, pending retrospective processing of IMERG in the TRMM era): Global and regional precipitation maps (accumulation, anomaly, normalized anomaly) for daily, 30-days, 60-days and 90-days.
- USDA Crop Explorer (10-day and anomaly; under development, pending retrospective processing of IMERG).
- New applications based on your inputs and use cases.



# Applications (Cont'd)

[3 Hours](#) | [24 Hours](#) | [10 Days](#) | [30 Days](#) | [60 Days](#) | [90 Days](#)

90-day Global and Regional Rainfall Maps			
	Accumulated Rainfall	Rainfall Anomaly	Rainfall Percent of Normal
Global	✓	✓	✓
Northern Hemisphere	✓	✓	✓
Southern Hemisphere	✓	✓	✓
North America	✓	✓	✓
South America	✓	✓	✓
Southeast Asia	✓	✓	✓
Central Asia	✓	✓	✓
Europe	✓	✓	✓
Australia	✓	✓	✓
Africa	✓	✓	✓
USA	✓	✓	✓
NE USA	✓	✓	✓
NW USA	✓	✓	✓
Central USA	✓	✓	✓
SE USA	✓	✓	✓
SW USA	✓	✓	✓



Monitoring El Nino (TMPA-RT)



# Applications (Cont'd)

**USDA** United States Department of Agriculture  
Foreign Agricultural Service

## Crop Explorer

Global Food Supply Monitoring

Home Help Contact Us

Switch to CE Google Maps

### Explore by Region

**North America**  
United States  
Canada

**Central America**  
Mexico  
Central America and Caribbean

**South America**  
Brazil  
Northern South America  
Southern South America  
Chile

**Europe**  
Europe

**Middle East**  
Iran, Iraq, Syria and Turkey

**South Asia**  
South Asia  
Sri Lanka  
Bangladesh

**Oceania**  
Australia

**Former Soviet Union**  
Kazakstan  
Russia, Azerbaijan, Armenia and Georgia  
Ukraine, Moldova, and Belarus

**Africa**  
North Africa  
Southern Africa  
East Africa  
West Africa

**Asia**  
Eastern China  
Southeast Asia  
Central Asia  
Korea

Site Index

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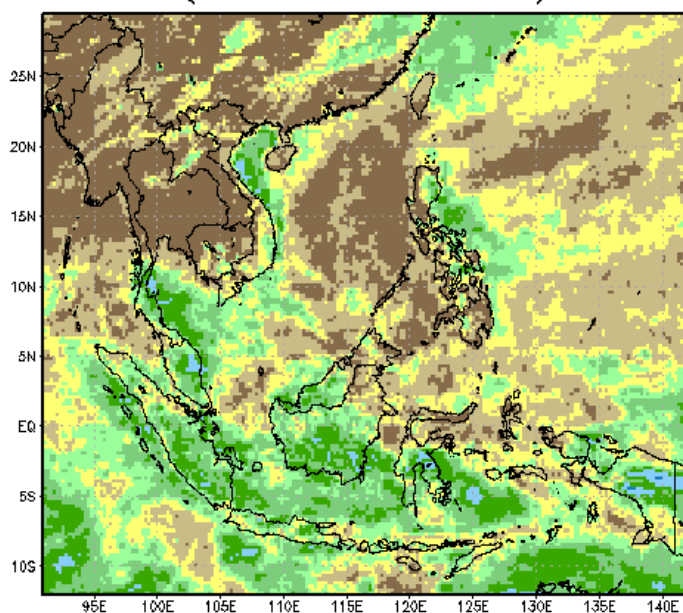
- Agricultural Production
- Archive Explorer
- Articles and Reports
- Explore by Crop
- Future of Land Imaging
- Geographic Search
- Global Climate Change
- Global Crop Production
- Global Reservoirs/Lakes (G-REALM)
- Landsat GloVis
- MODIS Image Gallery
- MODIS NDVI Gallery
- MODIS NDVI Time Series
- MPA Rainfall Maps**
- Outgoing Longwave Radiation Anomaly





# Applications (Cont'd)

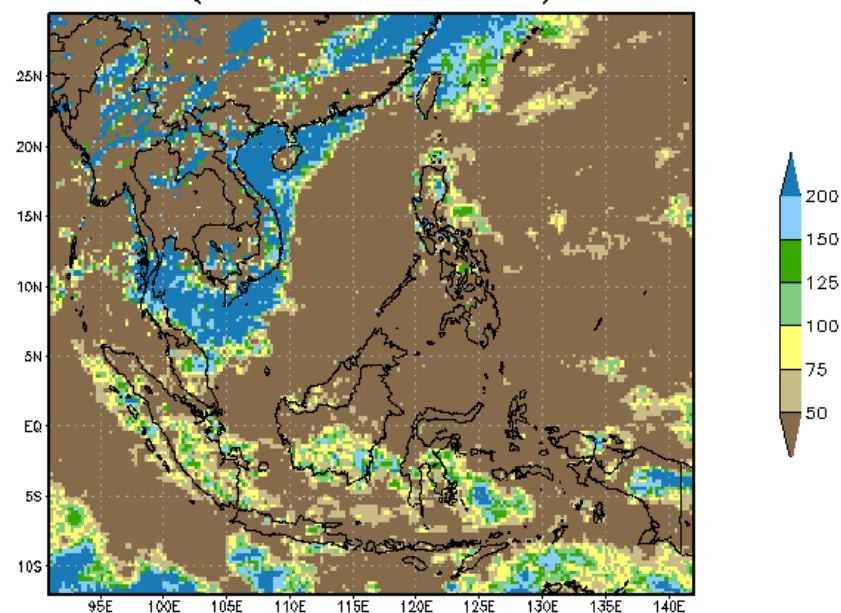
TMPA-RT Precipitation [mm]  
(21dec2015 - 31dec2015)



Generated by NASA's Giovanni ([giovanni.gsfc.nasa.gov](http://giovanni.gsfc.nasa.gov))

2016-01-05-22:35 GrADS: COLA/IGES

TMPA-RT Decadal Percent Normal Precipitation [%]  
(21dec2015 - 31dec2015)



Generated by NASA's Giovanni ([giovanni.gsfc.nasa.gov](http://giovanni.gsfc.nasa.gov))

2016-01-05-22:35



# Conclusion

- GPM data are available at the NASA GES DISC
- Other global datasets (TRMM, NLDAS, GLDAS, Merra, etc.) also available
- Data services available to facilitate data access and evaluation (UUI, Giovanni, SSW, etc.)
- Applications (under development) to support various activities





# Future Work

- Value-added products (e.g. daily IMERG)
- UUI (data related activities in one place) development
- Customized data (Level-2, 3) subsetting and visualization capabilities (event-based, shapefile-based, etc.)
- Mobile app development for easy access to GPM IMERG precipitation products and services
- Ancillary data service development for facilitating algorithm development and product evaluation
- Knowledge base development for product validation activities



# Information

- Search and download GPM data:  
<http://disc.sci.gsfc.nasa.gov/uui/search/gpm>
- Data subsetting: <http://disc.sci.gsfc.nasa.gov/SSW/>
- Online visualization and analysis: <http://giovanni.gsfc.nasa.gov>  
or Google search “NASA giovanni”
- USDA Crop Explorer:  
<http://www.pecad.fas.usda.gov/cropexplorer/>
- NASA precipitation site: <http://pmm.nasa.gov/>
- Comments and suggestions: [\*\*gsfc-help-disc@lists.nasa.gov\*\*](mailto:gsfc-help-disc@lists.nasa.gov)
- Related poster (on this Wed.): No. 847 - Using GPM IMERG Precipitation Products and Services at the NASA Goddard Earth Sciences Data and Information Services Center to Monitor and Study MJO Events (K. MacRitchie, D. Ostrenga, Z. Liu, and B. Vollmer)